

# A New Setup to Measure Friction of Thermoplastic Composite Tape in Melt

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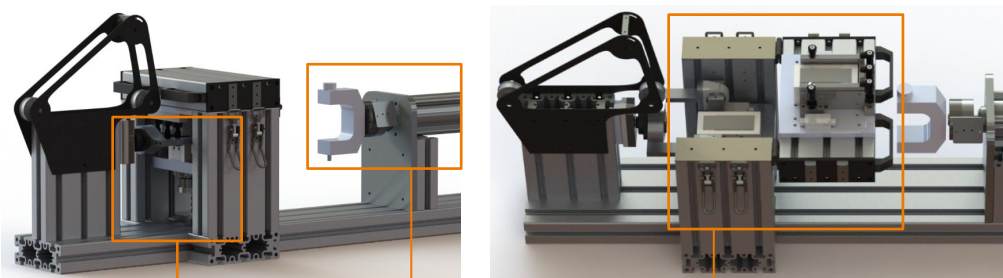
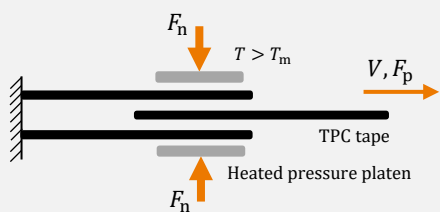
## Hot Press Forming & Process Simulations for First-Time-Right Manufacturing of TPC Parts



Accurate **forming predictions** require **accurate characterization** of the material behavior, classified in several **deformation mechanisms**. We developed a **new setup** to characterize one of these mechanisms: **inter-ply slip**.

### 1 Conceptual design

Slippage between adjacent plies (ply-ply friction):

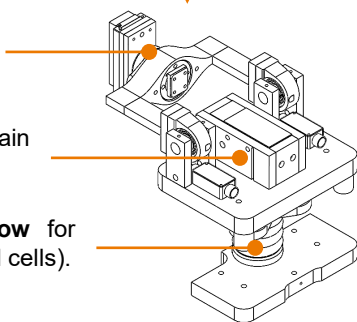


### 2 Features

**Guiding system** for 3 DoF of lower platen to obtain a **uniform pressure distribution**.

**Multiple heating cartridges** to obtain **uniform temperature distribution**.

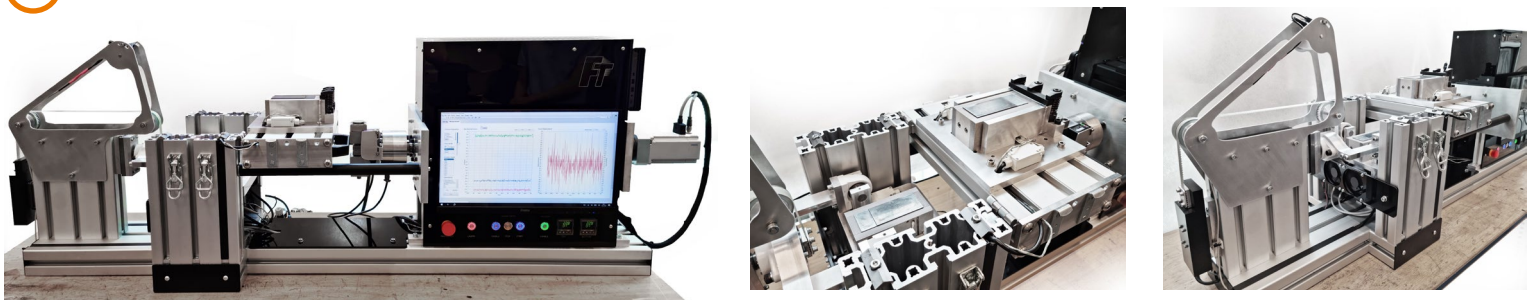
LabVIEW-controlled **air bellow** for constant **normal force** (3 load cells).



**Open workspace** to easily mount a specimen with **good alignment** in fast clamping system (different fiber orientations possible).

**Controlled actuator** for both **rate- and stress-controlled** friction tests. Data logging via LabVIEW.

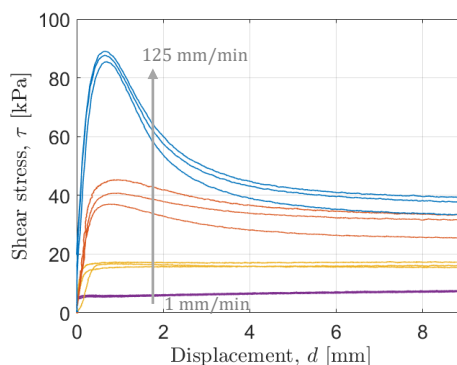
### 3 Realization



### 4 Characterization

Future work:

- Compare results from new friction tester with current one for different TPC tapes.
- Include new friction tester in ongoing worldwide benchmark exercise.
- Perform new tests to further investigate the underlying mechanisms for inter-ply friction of TPC tapes in melt.



First ply-ply friction experiments for UD C/PEEK tape in melt.

Rate-controlled at 1, 5, 25, and 125 mm/min with 15 kPa normal pressure and a temperature of 385 °C in triplicate.

